

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET (Pursuant to NAC 445A.236) December 2003

PERMITTEE NAME: North Valley Wastewater Treatment Plant

PERMIT NUMBER: NEV60025

LOCATION: North Valley Wastewater Treatment Plant
Heybourne Road, north of Stephanie Lane
Minden, Douglas County, Nevada 89423

Latitude: 39°03'41" North
Longitude: 119°45'28" West

FLOW: 30-Day Average: 0.45 Million Gallons per Day (MGD)
Daily Maximum: 0.45 MGD

GENERAL:

The Douglas County, Nevada, North Valley Wastewater Treatment Plant (NVWWTP) provides secondary wastewater treatment using a Biolac Aeration System and chlorine disinfection. The system was installed using two (2) of the five (5) ponds previously used for wastewater treatment and has a design capacity rated for a daily maximum of 0.45 million gallons per day (mgd). The remaining three (3) ponds are lined with polyvinylchloride and used, as necessary, for sludge storage.

The Biolac system integrates extended aeration and mixing to optimize activated sludge treatment based on a 40 to 50-day solids retention time. An integrated clarifier provides solid/liquid separation, concentrates the settled sludge, and returns activated sludge to the front end of the aeration basin. A traveling, flocculating rake mechanism evens the sludge blanket and pushes excess sludge towards the sludge airlift suction assembly. Periodically, excess solids are wasted to a sludge storage basin instead of recirculating back to the aeration basin to maintain a consistent solids retention time.

Treated effluent decanted over a double-sided floating weir assembly is discharged from the clarifier to a chlorine contact basin for disinfection. The 15,560-gallon basin effects two (2) fluid passes to provide adequate retention time and uses a metering pump to dose sodium hypochlorite at volumes sufficient to produce a residual (unreacted) concentration of chlorine in the range of 1 to 3 milligrams per liter (mg/L).

Treated effluent is not denitrified, and while the concentration of total nitrogen in treated effluent cannot be confirmed by data on file, nitrate concentrations in groundwater monitoring wells located in and near a former, on-site reuse area have been quantified as high as 30 mg/L¹. Effluent discharge to this irrigation field was discontinued June 1, 1997, in part due to the elevated nitrate concentrations in groundwater, in favor of discharge to the Incline Village General Improvement District (IVGID) Wetlands located at the northern edge of Douglas County. A discharge of up to 0.45 mgd of treated effluent is currently authorized by the Division, and discharge to the on-site irrigation field is included in the proposed permit renewal as a secondary, emergency discharge option, only.

IVGID is responsible for monitoring and maintaining groundwater quality associated with, and as a function of, the management of the wetlands under Groundwater Discharge Permit NEV30009. Therefore, effluent discharge limitations for nitrogen species and phosphorus under the NVWWTP Permit NEV60025 will be satisfied as a 'monitor and report' obligation, effectively deferring the responsibility for groundwater conditions in the wetlands to

¹ 3rd and 4th Quarters 1999 Discharge Monitoring Reports

IVGID.

The proposed permit renewal includes specific provisions to permit: (1) discharge to the IVGID Wetlands at a rate of 0.45 mgd and (2) emergency discharge of treated wastewater to the on-site irrigation plots. Authorization for the discharge to the irrigation plots relies on the continued monitoring of wells MW-1, 2, and 3 to ensure a balanced nitrogen load and specific reporting requirements to notify the Division when a discharge to the irrigation plots occurs. Effluent discharge for reuse irrigation at other sites or facilities requested in the future will be considered as a major modification to the permit, and discharge for reuse irrigation to any other site may require denitrification, groundwater monitoring, or both, at the discretion of the Nevada Division of Environmental Protection Bureau of Water Pollution Control (Division).

DISCHARGE CHARACTERISTICS

The existing NVWWTP permit was issued in 1997 and modified in 1999 to eliminate effluent monitoring for the Outfall 001 discharge to ponds numbered 3 and 5. The modification refocused compliance monitoring parameters on the discharge to the on-site irrigation field (Outfall 002) and the discharge to the IVGID wetlands (Outfall 003). However, after the 1999 modification, NVWWTP continued to monitor and report compliance parameters based on the requirements established in the 1997 version of the permit. Consequently, since compliance monitoring for the Outfall 001 discharge to the ponds has been discontinued since 1999, concentrations of nitrogen species in the discharge, either to the reuse field or to the IVGID wetlands, have not been reported.

Discharge limitations observed for Outfalls 002 and 003 have included constituents such as: 5-day carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS), and pH in accordance with State and federal requirements for secondary treatment standards, as well as limitations for flow and fecal coliform. Treated water discharged for irrigation is also subject to monitoring for chlorine residual, and the discharge to the wetlands must exhibit a dissolved oxygen concentration greater than 2 milligrams per liter (mg/L). Compliance data on file indicates that the discharges have been in compliance with the parameters monitored with the single exception of a dissolved oxygen concentration quantified at 1.66 mg/L during the first quarter 2002. No other compliance violations have been recorded.

Excess sludge is wasted to ponds numbers 4 and 5, which are lined with polyvinylchloride (PVC) liners topped with 12-inch soil covers. Pond 4 has an effective storage volume of approximately 500,000-gallons, and Pond 5 has a capacity of approximately 2.74-million gallons. As of 2002, Pond 5 was used as a secondary sludge storage basin for sludge drying, however, the larger capacity is also used to accommodate additional volume during the winter months.

Three (3) monitoring wells (MW-1, 2, and 3) are located at the treatment works in and around the irrigation plots and adjacent to the pond locations to confirm groundwater characteristics and ensure that potential leakage through the lined ponds is not impacting groundwater. MW-1 is located immediately outside the facility fence line to the north-northwest of the Biolac™ system, MW-2 is located adjacent to the northeast corner of Pond 5, and MW-3 is located upgradient of the treatment works and irrigation plots, at the eastern boundary of the reuse field.

RECEIVING WATER CHARACTERISTICS:

Treated effluent is discharged to groundwater of the State of Nevada. NVWWTP is located approximately 0.5-mile east of the Carson River and due south of the IVGID wetlands. Groundwater at the NVWWTP typically ranges between 6 and 15 feet below grade surface (bgs), exhibits a westerly flow direction toward the Carson River, and is subject to influence from agricultural irrigation and ranching activities. Past reuse practices caused groundwater concentrations of nitrate to increase to as high as 30 mg/L in late 1999, but these concentrations have diminished since treated effluent has been exclusively discharged to the IVGID wetlands. Current nitrate concentrations at the monitoring well locations have subsided to below 3 mg/L² and total dissolved solids (TDS) concentrations are quantified between 1300 and 2000 mg/L. Groundwater concentrations at the 6 monitoring

² 2nd Quarter 2003 DMR

well locations sampled at the wetlands under the IVGID Wetlands Permit NEV30009 indicate nitrate concentrations less than the 0.11 mg/L detection limit and TDS concentrations ranging from 793 to 3436 mg/L.

There are approximately 20 domestic and three (3) irrigation wells within a one-mile radius of the treatment works. Eighteen (18) of the domestic wells are located in a cross or up-gradient direction from the treatment works, leaving only one domestic well in a downgradient flow direction from the treatment works and emergency discharge irrigation plot(s). The remaining domestic well identified is an on-site make-up water supply well for the treatment works. The on-site well is constructed of 6⁵/₈-inch casing to a depth of approximately 136 feet below grade surface, with a 55-foot sanitary seal. The single down-gradient domestic well appears to be located in nearby fields also subject to irrigation with reclaimed wastewater (reuse site), and on-site groundwater monitoring at the NVWWTP should be sufficient to demonstrate potential groundwater impacts prior to any off-site or downgradient ramifications from the treatment works or irrigation plots.

Proposed Limitations:

Effluent Discharge Limitations: During the period beginning on the effective date of this permit and lasting until the permit expires, the Permittee is authorized to discharge from:

- Outfall 001: To the IVGID Wetlands
- Outfall 002: To the NVWWTP reuse irrigation field

Confirmation samples or discharge parameter measurements shall be collected at:

- Influent: At the intake of the Parshall flume for flow measurements and at the influent pump station wet well for laboratory samples
- Effluent: After the chlorine contact chamber overflow weir and prior to the effluent wetwell
- Outfall 001: After the chlorine contact tank and prior to discharge to the IVGID Wetland
- Outfall 002: After the chlorine contact tank and prior to discharge to the irrigation plots

The discharge shall be limited and monitored by the Permittee as specified below:

Continued on the Next Page ➤

Effluent Reuse Limitations

PARAMETERS	MONITORING LOCATION	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS	
		30-Day Average	Daily Maximum	Monthly Total	Measurement Frequency	Sample Type
Influent Flow Rate (mgd)	Influent	0.45	0.45	----	Continuous	Flow Meter
CBOD ₅ (mg/L)	Influent	Monitor & Report			Monthly	Composite
CBOD ₅ (mg/L)	Effluent	30	45	----	Monthly	Composite
CBOD ₅ Treatment Efficiency	----	85%	----	----	Monthly	Calculation
Total Suspended Solids (mg/L)	Influent	Monitor & Report			Monthly	Composite
Total Suspended Solids (mg/L)	Effluent	30	45	----	Monthly	Composite
Total Suspended Solids Treatment Efficiency	----	85%	----	----	Monthly	Calculation
Fecal Coliform (CFU/mL)	Effluent	23/100	240/100	----	Monthly	Discrete
pH (SU)	Effluent	6.0 to 9.0			Monthly	Discrete
Total Nitrogen as N (mg/L)	Effluent	Monitor & Report			Monthly	Composite
Nitrate as N (mg/L)	Effluent	Monitor & Report			Monthly	Composite
Chlorine Residual (mg/L)	Effluent	Monitor & Report			Monthly	Discrete
Dissolved Oxygen (mg/L)	Outfall 001	> 2.0	> 2.0		Monthly	Discrete
Priority Pollutants ¹	Effluent	Monitor & Report			Biennially – Even Years	Discrete
Irrigation Volume (gallons)	Outfall 002	----	----	Monitor & Report	Monthly	Flow Meter
Actual Nitrogen Loading (lbs/acre/quarter)	Outfall 002 (Effluent)	Monitor & Report ^{2, 3}			Quarterly	Calculation
Cumulative Nitrogen Loading to date (lbs/acre/year) ⁴	Outfall 002	Monitor & Report ^{2, 3, 4} (<110% total annual nitrogen uptake)			Quarterly	Calculation

mgd Million gallons per day
 CBOD₅ 5-day carbonaceous biochemical oxygen demand
 CFU/mL Colony forming units per milliliter
 SU Standard Units
 mg/L Milligrams per liter
 as N As nitrogen
 lbs/year Pounds per year
 EMP Effluent Management Plan

Footnotes:

1. Priority Pollutants listed in Attachment A. Sample to be analyzed during the 4th quarter of even years and reported in the 4th Quarter Annual Report.
2. Acre-Feet (AF x 3.069 = Million Gallons). Volume determined for/from Consumptive Use Balance.
3. Mass determined in accordance with guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan* for fields managed by NVWWTP.
4. The total annual nitrogen applied (lbs/acre/year) shall not be greater than 110% of the total annual nitrogen uptake (lbs/acre/year). Calculations and monitoring data (submitted quarterly) shall consider the **total nitrogen** in the applied wastewater (monitored by the treatment facility), total nitrogen from fertilizer applications, nitrogen uptake by crops or vegetation, evapotranspiration rate, precipitation rate, and fraction of applied nitrogen removed by denitrification and volatilization. Quarterly calculations shall be used to reconcile nitrogen loading with estimated nitrogen uptake (lbs/acre/year) defined in the EMP, and an annual report shall be submitted for the fourth quarter of every year indicating the cumulative nitrogen load applied.

Rationale for Effluent Discharge Limitations:

The rationale for the proposed monitoring conditions is as follows:

- *Flow*: 0.45/0.45 mgd - The treatment system is approved by the Division for an operating capacity of 0.45 mgd.
- *5-Day Carbonaceous Biochemical Oxygen Demand (CBOD₅)*: 30 mg/L (113 pounds per day [#/day]) 30-day average and 45 mg/L daily maximum (169 #/day). The 30-day average limitation is based on "secondary treatment standards" cited under Nevada Administrative Code (NAC) 445A.275. The daily maximum limitation of 45 mg/L has been preserved from the previous permit as an achievable level of treatment sufficiently protective of groundwater of the State. A minimum treatment efficiency of 85% is required between the influent and effluent concentration per NAC 445A.275 and 40 CFR §133.102.
- *Total Suspended Solids (TSS)*: 30 mg/L (113 #/day) 30-day average and 45 mg/L daily maximum (169 #/day). These limitations are based on secondary treatment standards required under 40 Code of Federal Regulations (CFR) §133.102. A minimum treatment efficiency of 85% is required between the influent and effluent concentration per NAC 445A.275 and 40 CFR §133.102.
- *Fecal Coliform*: 23 colony forming units (cfu)/100 mL 30-day average and 240 cfu/100 mL daily maximum are the required limitations for irrigation in areas where public access to the site is controlled. A 100-foot buffer zone around the area irrigated is required per NAC 445A.276.
- *pH*: 6.0-9.0 standard units. This limitation is based on reuse requirements and secondary treatment standards per NAC 445A.275 and 40 CFR §133.102.
- *Total Nitrogen as Nitrogen*: Monitor and Report. This reporting requirement is included to reconcile the total mass of nitrogen discharged to the IVGID Wetland or applied to irrigation fields, and to evaluate the potential for the combined forms of nitrogen to convert to nitrate in a shallow groundwater environment.
- *Nitrate as Nitrogen*: Monitor and Report. This reporting requirement is included to evaluate the proportional distribution of nitrogen compounds in the treated effluent discharge and to assess the potential for direct impact to the shallow aquifer environment.
- *Chlorine Residual*: Monitor & Report: This reporting requirement is included to confirm adequate, but not excessive, disinfection of the wastewater prior to discharge and to avoid toxic effects on wetlands.
- *Dissolved Oxygen*: A minimum dissolved oxygen concentration of 2 mg/L is required to avoid putting an

unnecessary oxygen demand on the IVGID Wetland.

- *Priority Pollutants:* An annual monitoring requirement for priority pollutants has been added to routinely confirm the absence of industrial pollutants in the treated discharge and to provide sentinel data regarding the chemical quality of the discharge.
- *Irrigation Volume:* Monitor and Report. This reporting requirement is included to verify the total amount of treated effluent discharged for reuse on irrigation fields (derived from monthly monitoring data).
- *Actual Nitrogen Loading:* Monitor and Report. This reporting requirement is included to verify the total amount of nitrogen applied to NVWWTP irrigation plots (treated effluent, fertilizers, and other nitrogen bearing supplements, etc.), and shall be calculated quarterly in accordance with the procedures outlined in guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan* (EMP). Concentration data collected at the Effluent monitoring location is considered indicative of the nitrogen concentration in effluent discharged to the irrigation plots.
- *Cumulative Annual Nitrogen Loading to Date:* Monitor & Report. The year-to-date sum of the nitrogen mass, in units of pounds per acre, applied to the irrigation plots is required to be reported for comparison with the estimated nitrogen uptake derived in the EMP. Quarterly mass accounting and reporting provides a more proactive assessment of mass loading as a predictive tool to refine irrigation procedures to avoid over application of nitrate.

Groundwater Monitoring:

Monitoring wells MW-1, MW-2, and MW-3, shall be sampled for the presence of nitrogen compounds, total dissolved solids (TDS), and chloride. Measurements of electrical conductivity (EC), depth to groundwater, and groundwater elevation will also be required on a quarterly basis. Wells shall be monitored in accordance with permit conditions and defined sampling and analysis protocol included in the revised Operations and Maintenance (O&M) or EMP, which must be submitted for approval by the Division.

Should site investigation activities, long-term monitoring results, and/or remedial efforts necessitate or warrant the installation of additional monitoring wells, all additional wells shall be incorporated into the required monitoring schedule. All subsequent monitoring wells installed shall be constructed in accordance with "WTS-4: Monitoring Well Design Requirements"(NDEP, February 1997). The installation and use of additional wells must be reported to the Division to be amended to the groundwater monitoring program (requirements) as a minor modification to the permit.

Groundwater wells shall be monitored according to the following parameters:

Groundwater Monitoring Requirements

PARAMETER	REQUIREMENTS	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE TYPE
Depth to Groundwater (feet)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Field Measurement
Groundwater Elevation (feet above msl)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Calculate
Electrical Conductivity (μ mhos or μ Siemens/cm)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Discrete
Nitrate as N (mg/L)	10	MW-1, MW-2, & MW-3	Quarterly	Discrete
Total Nitrogen as N (mg/L)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Discrete
Chlorides (mg/L)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Discrete
Total Dissolved Solids (TDS, mg/L)	Monitor & Report	MW-1, MW-2, & MW-3	Quarterly	Discrete

msl: mean sea level (above)
 mg/L: milligram per liter
 as N: as Nitrogen

The detection of concentrations of nitrate as nitrogen (-N) in groundwater samples invoke, at a minimum, the following limitations and response requirements:

- i. If the nitrate-N concentrations increase to 7.0 milligrams per liter (mg/L), the Permittee shall immediately notify the Division, and within 90-days, conduct a pond liner evaluation to confirm the structural integrity of the ponds and submit the results of the evaluation with a plan for the reduction of nitrogen in groundwater.
- ii. If the nitrate-N concentration in groundwater increases to 9.0 mg/L, the Permittee shall begin implementation of the plan for the reduction of nitrogen loading to groundwater.
- iii. If the nitrate-N concentration increases to 10.0 mg/L, the discharge to groundwater must cease.

SCHEDULE OF COMPLIANCE:

The Permittee shall implement and comply with the provisions of the permit upon issuance and observe the following schedule of compliance, after approval by the Administrator, including in said implementation and compliance, any additions or modifications the Administrator may make in approving the schedule of compliance:

⇒ **Within 90 days of the permit issue date (date)**, the Permittee shall submit an updated O&M Manual prepared in accordance with guidance document *WTS-2: Minimum Information Required for an Operations and Maintenance Manual*.

- i. The updated O&M Manual must be stamped by a Professional Engineer licensed in the State of Nevada;
- ii. The updated O&M Manual must include provisions for the removal of weeds and woody species

from pond berms and for the removal of burrowing animals;

- iii. The updated O&M Manual must include provisions for vector attraction controls; and,
- iv. Septage handling and management procedures shall be described and defined in the O&M Manual.

⇒ **Prior to discharge to the irrigation plots**, the Permittee shall submit an EMP, prepared in accordance with guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan. General Criteria for Preparing an Effluent Management Plan*, to the Nevada Division of Environmental Protection Bureau of Water Pollution Control (Division) for approval. The EMP must be approved by the Division prior to discharge to the irrigation plots, and must describe procedures for calculating and/or mitigating nitrogen load to the subsurface as a function of intermittent discharge and in the absence of cultivated crops. The EMP shall also include:

- i. A section detailing a sampling and analysis program for groundwater monitoring activities.
- ii. A copy of the document prepared notifying affected facility personnel of the possible hazards and proper hygiene of working with and around reclaimed water.
- iii. Documentation that notification has been made to the local water purveyor and the local health agency of the use of reclaimed water at the subject facility. The document shall describe the plan for complying with the cross-connection control requirements of the local water purveyor.

The EMP may be incorporated as a separate section of the O&M Manual, and is subject to Division approval prior to discharge to the irrigation plots. The EMP and all other plans or specifications submitted to the Division must be stamped by a Professional Engineer registered in the State of Nevada.

PROPOSED DETERMINATION:

The Division has made the tentative determination to issue (renew) the proposed permit for a 5-year period. In accordance with Nevada Administrative Code (NAC) 445A.232, this discharge falls under the category of a *Discharge of Domestic Wastewater 250,000 gallons or more but less than 500,000 gallons daily*.

PROCEDURES FOR PUBLIC COMMENT:

Notice of the Division's intent to issue a permit authorizing the facility to discharge to ground water of the State of Nevada, subject to the conditions contained within the permit, is being sent to **The Record Courier** (Douglas County legal notices) for publication. Notice is also mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of the public notice, and must be postmarked, faxed, or e-mailed by 5:00 p.m. on **January 26, 2004**. The comment period can be extended at the discretion of the Administrator. A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected interstate agency, the Regional Administrator, or any interested agency, person, or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reason(s) why a hearing is warranted.

Any public hearing determined by the Administrator to will be conducted in the geographical area of the proposed discharge or any other area the Administrator determined to be appropriate. All public hearings will be conducted in accordance with NAC 445A.238. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Prepared by:

Tamara J. Pelham

Final Draft December 23, 2003

P:\BWPC\BWPC Permits\NV and NEV\North Valley WWTP\2003 Permit\NVWWTP draft factsheet